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Title : Reproductive senescence in grey seals

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Abstract : Natural selection operates with reduced strength on older individuals in a cohort, thus resulting in the evolution of senescence. Evidence for this effect is uncommon in pinnipeds, presumably because few data are available for the oldest individuals within a population. We studied reproductive performance in 229 known-age (i.e., branded at weaning) female grey seals (Halichoerus grypus), ages 4-39, between 1991 and 2003 on Sable Island, Nova Scotia. These females produced 1714 pups; we measured maternal mass at 3 days postpartum and pup mass at weaning in 1477 of those pups. Maternal mass increased with maternal age through the middle teens and then reached an asymptote. Weaning mass was positively correlated with maternal mass ($r = 0.75$, $p < 0.001$). Weaning mass of male pups (51.2,0.97[SE]) was significantly greater than that of female pups (48.2,0.75; ANCOVA with maternal mass as covariate, $p = 0.007$). Of the 1477 pups studied, 373 were born to females >20 yr. Weaning mass increased with maternal age to about age 9 yr and then was relatively stable from ages 10 to 20 yr. In females beyond age 20 yr, weaning mass of male pups was negatively correlated with maternal age ($r = -0.93$, $p < 0.001$). Weaning mass of female pups was also negatively correlated with maternal age, but this decline did not begin until females were about age 26 yr ($r = -0.81$, $p < 0.009$). Pup sex and lactation length (17.2,2.7 days) were independent of maternal age in females age 20 yr and older. Our data indicate that reproductive senescence is expressed in older females through a decline in pup weaning mass, but not in the duration of lactation. Further, the effects of senescence are expressed earlier in male pups, the more expensive sex, than in female pups.